Claims

1. A method for stable transduction of primary cells of the hematopoietic system and/or hematopoietic stem cells comprising contacting the surface of said cells with both a lentiviral vector and at least one molecule which binds said cell surface wherein said contacting occurs *in vitro* or *ex vivo* and

wherein greater than about 90% of the cells are stably transduced after about 14 days.

2. The method of claim 1 wherein said contacting the cells with a lentiviral vector occurs before contacting the cells with at least one cell surface binding molecule.

3. The method of claim 1 wherein said contacting the cells with a lentiviral vector occurs simultaneously with contacting the cells with at least one cell surface binding molecule.

4. The method of claim 1 wherein said contacting the cells with a lentiviral vector occurs after contacting the cells with at least one cell surface binding molecule.

5. The method of claim 1 where said contacting with a lentiviral vector occurs more than once.

6. The method of claim 1 wherein said lentiviral vector is derived from HIV-1.

7. The method of claim 1 wherein said cell surface binding molecule is an antibody, a ligand or a cell surface molecule.

8. The method of claim 1 wherein said lentiviral vector comprises at least one cis-acting nucleotide sequence derived from the gag, pol, env, vif, vpr, vpu, tat or rev genes.

9. The method of claim 8 wherein said sequence is not expressed or is a fragment or a mutant of the gag, pol, env, vif, vpr, vpu, tat or rev genes.

10. The method of Claim 1 wherein said lentiviral vector is derived from HIV-2.

11. The method of claim 1 wherein said lentiviral vector is a pseudotyped vector.

12. The method of claim 11 wherein said pseudotyped vector contains the vesicular stomatitis virus G envelope protein.

13. The method of claim 1 wherein said lentiviral vector is a chimeric vector comprising HIV-1 and HIV-2 sequences.

14. The method of claim 1 wherein said hematopoietic cell is a CD4 positive cell.

15. The method of claim 1 wherein said hematopoietic cell is a lymphocyte.

16. The method of claim 15 wherein said lymphocyte is a CD4 or CD8 positive cell.

17. The method of claim 1 wherein said hematopoietic cell is a CD34 positive cell.

18. The method of claim 17 wherein said at least one cell surface binding molecule comprises a molecule selected from FLT-3 ligand, TPO ligand, Kit ligand, or antibodies that are cell surface binding analogs of FLT-3 ligand, TPO ligand, or Kit ligand.

19. The method of claim 1 wherein said at least one cell surface binding molecule comprises a molecule selected from FLT-3 ligand, TPO ligand, Kit ligand, or antibodies that are cell surface binding analogs of FLT-3 ligand, TPO ligand, or Kit ligand.

20. The method of claim 1 wherein the said cell is a dendritic cell or a cell capable of differentiating into a dendritic cell.

21. The method of claim 20 wherein said at least one cell surface binding molecule is selected from compositions comprising GM-CSF, IL-4, and TNF-alpha; GM-CSF and interferon-alpha; or antibodies that are cell surface binding analogs of GM-CSF, IL-4, and TNF-alpha; GM-CSF or interferon-alpha.

22. The method of claim 14 wherein said at least one cell surface binding molecule is selected from the group consisting of CD3 antibodies and fragments thereof, CD28 antibodies and fragments thereof, and combinations of said antibodies and fragments thereof.

23. The method of claim 22 wherein said at least one cell surface binding molecule comprises a combination of CD3 and CD28 antibodies immobilized on coated beads.

24. The method of claim 3 further comprising culturing the cells under conditions conducive to growth and/or proliferation.

25. The method of claim 24 wherein said conditions comprise further incubation with a cell surface binding molecule or a cytokine.

26. The method of claim 25 wherein said cytokine is interleukin-2.

27. The method of claim 24 wherein said culturing is for about seven days.

28. The method of claim 24 wherein said culturing is for about 14 days.

29. The method of claim 3 wherein said contacting the cells with a lentiviral vector is for about 24 hours and is optionally repeated at least once.

30. The method of claim 1 wherein the lentiviral vector is present at an MOI of less than 500.

31. A method to introduce genetic material into a living subject comprising introduction of a cell transduced by the method of claim 1.

32. The method of claim 4 further comprising culturing the cells under conditions conducive to growth and/or proliferation.

33. The method of claim 1 wherein said contacting occurs *ex vivo*.